THE ALLIGATOR GAR

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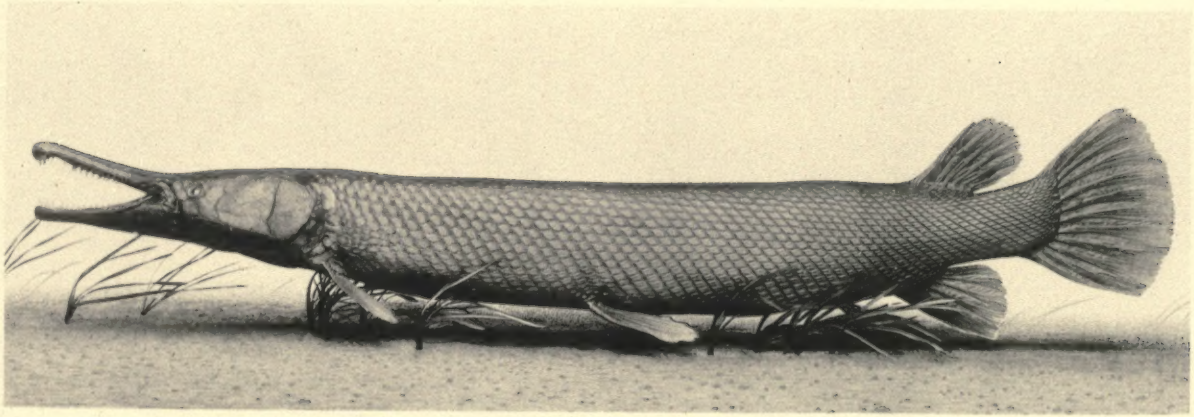

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Along the shore of the Gulf of Mexico and extending several hundred miles up the Mississippi River is a narrow strip of country which it is hardly correct to describe as either land or water. Most of the year it is out of the water or partly flooded but a rise of only a few feet in the rivers or an extra high tide may submerge large areas of it. Farther inland it rises slowly but even at St. Louis, a day's travel (700 miles) away from the Gulf, it is only, comparatively, a few feet above tidewater.

The streams of this region are mostly narrow and usually deep. The banks are composed of light mud or sand or of lighter material derived from the decay of the leaves or plants that grow in or fall in them. In a few hours the current may cut through a bend and leave a large part of the stream as a "horseshoe pond" or it may even cut through so as to reverse the direction of the current.

Many strange creatures, such as the Water Turkey, the Alligator Snapping Turtle, the Moccasin Snake and big catfish live in the swamps, lakes and bayous. This region is also the home of two strictly American creatures, the Alligator and the Alligator Gar or Great Gar. The Alligator has a small cousin in rivers of China but the gars are strictly American. The Alligator Gar is a great fish which probably owes its name to the fact that it is provided with a shining armor as hard and strong as the bony plates of the Alligator.

Most of the streams, ponds and bayous of this region are dark in color, either because the waters carry a load of mud or because they are stained a deep brown with the leachings from the soil. There are a few clear streams flowing over bottoms of sand or gravel, and it was in one of these that a friend had his first experience with an Alligator Gar. Walking along the bank, he stopped and looked down into the clear water of a large pool. Little by little he was able to pick out objects on the bottom and soon he realized that the things which looked so much like logs and posts were great fish. It did not take him long to return to the house and get a spear.

The fish were still in sight as he returned and he lost no time in striking at the nearest one. He seemed to miss the fish and strike a rock or something else that damaged the spear. After a few more trials he found that the injury came from striking the fish and that he could hardly startle them. The one he might strike would move a little but the others paid no attention to him. Later he tried to shoot one of the fish but even that did not seem to injure it very much.

Even those who do not like gars may find them extremely interesting. Their appearance is so different from that of most other fishes living today that it attracts attention. The geologist and the zoologist find that they resemble the fishes that lived in past ages much more than they do any that are known now. Their family tree goes far back before it unites them with the ancestors of other fishes.

There are about four species of gars, three of them being found in the United States. The southern limit of distribution is not well known. The Tropical Gar (*Lepisosteus tropicus*), if it is different from the Alligator Gar, seems to be confined to waters near the coast in Central America. The Alligator Gar, or Great

Gar (*Lepisosteus tristoechus*), is found in Cuba and along the coast of the Gulf of Mexico. It is common in the Mississippi River about to St. Louis and is often seen as far as the mouth of the Illinois River. Some are taken in the latter stream, almost every year, about as far up as Beardstown, Illinois. The Short-Nosed Gar (*Lepisosteus platostomus*) is found mostly in the Mississippi Valley region and in Lake Erie. The Long-Nosed Gar, or Billfish, (*Lepisosteus osseus*) is found in all suitable waters from the Gulf of Mexico to the Great Lakes, including the Atlantic Coastal Plain. They are fairly common market fish in parts of North Carolina.

There are several groups of living fishes which wear coats of mail. The Sea-Horses and the Pipefishes have a body covering of bony rings which lock together. The Trunkfishes have encased themselves in solid boxes of bone, much as the turtles have done. Many of the common fishes of the open ocean have strong series of bony plates along the sides of the tail. The sturgeons have rows of bony shields along the back and sides. Many of the catfishes of South America have similar protection. In two groups, the Bichirs and the Gars, the armor consists of a series of interlocking plates, smooth and shining, and hard as flint. The Bichirs are found in central and northern Africa and are related to the gars only inasmuch as both are the last representatives of the common fishes of ages long past.

The smooth, shining "ganoid" plates of the gars are composed of a hard outer layer much like the enamel of a tooth in structure and having a similar origin in the outer layer of the skin. Within is a softer structure much like the dentine of a tooth. These plates are so hard that it is, at least, a common story to tell of seeing fire fly from the edge of the axe

when trying to chop through the skin of a gar. Each plate has a long point which lies under the edge of the next one and is bound to it by the tough skin (Figs. 1 and 2). This gives great strength without stiffness.

One who may see a dead gar on the bank or watch a living one floating quietly at the surface is likely to get the idea that it is rather stiff and awkward in its movements. When at rest the gar—any gar—lies

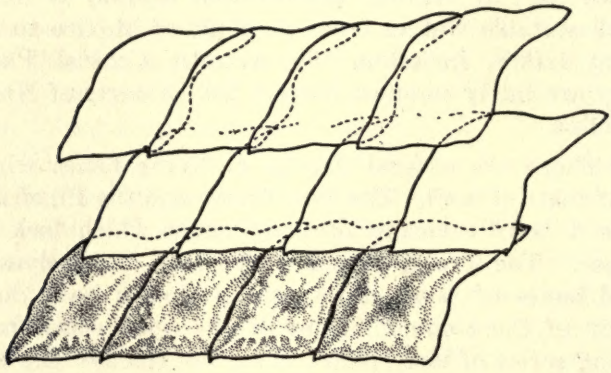

Fig. 1.

Bony plates of Alligator Gar, showing how they fit together. Natural size.

quite straight, with none of the body movements of fish of less ancient lineage. The only sign of life is the movement of the balancing fins, to prevent being overturned by little currents in the water. All this is changed when the fish moves. The swimming gar is almost as sinuous as an eel. It may end its dash with a long, straight, pikelike shoot; but it uses its whole body in the exertion of starting.

The Short-Nosed Gar and the Tropical Gar do not reach a length much more than three feet. The Long-Billed Gar reaches a length of about six feet. The Alligator Gar is much larger. Even at a length of six feet it is much larger than a six-foot "Billfish."

The Great Gar is one of the largest fish in the fresh waters of North America. It may not be quite as large as some of the sturgeons that come into the bays along the Atlantic coast, but they are sea fish and seldom run up above tidewater. So little is known of this great fish that it is hard to get a true idea of its size. Estimates in the books run as high as twenty feet. Talks with fishermen along the river seem to

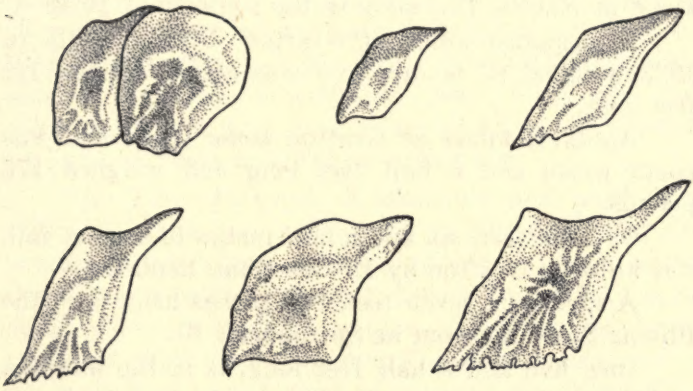

Fig. 2.
Bony plates of Alligator Gar, showing differences in size and form in different parts of the body. Natural size.

show that a gar ten feet long is far beyond the average size. Below are given some of the records:

Dr. D. S. Jordan says the fish reaches a length of twenty feet but gives no record of specimens actually measured.

Mr. George Powers Dunbar, writing about 1840, said that gars of twelve to fourteen feet in length were "often seen in the Mississippi."

Mr. Percy Viosca, Jr., speaks of a record of a ten-foot specimen as "eye measurement."

Dr. L. Hussakof tells of seeing gars over nine feet long being cut up for food at Moon Lake, Mississippi.

Dr. S. E. Meek gives the length as ten to twelve feet but gives no record of actual measurement of specimens.

Jordan and Evermann give the length as eight to ten feet.

The New Orleans Times-Picayune tells of a specimen 8 feet long in the Louisiana State Museum.

A specimen eight feet, seven inches long was killed at Naples, Ill., early in the summer of 1922.

A specimen killed at Grafton, Illinois, early in 1922 weighed 87 pounds and was almost exactly six feet long.

Another, killed at Grafton some years ago was about seven and a half feet long and weighed 176 pounds.

One, six feet, six and a half inches to base of tail, was killed at Grafton by Mr. Sherman Reubel.

A specimen, seven feet, two inches long, is in the Illinois State Museum at Springfield, Ill.

One, five and a half feet long, is in the museum of Illinois University.

Two specimens, mounted, and one skeleton, each about seven feet long are in Field Museum.

An old record in Forest and Stream gives length seven feet, four inches, girth forty inches and weight 274½ pounds.

Dr. L. Hussakof tells of one six and a half feet long that swallowed a Short-Nosed Gar exactly one-third its length.

The habits of fishes are very largely determined by the conditions under which they live. Many of the species of the open ocean, especially relatives of the Mackerel, are strong, swift swimmers which may travel long distances at the same high speed without stopping to rest. There are no fishes of this type in our fresh water streams and lakes. The nearest ap-

proach to it is perhaps found in the Lake Trout and some other species in the larger lakes. They hunt their prey in the open water and catch it because they have greater speed.

The Black Bass, Brook Trout, and similar fishes lie in wait until their food floats or swims within striking distance. They are able to move with tremendous speed for a few feet but are seldom called upon to make any sustained effort. Their habit of living in very rapid water has led many to believe that they are fighting the current all the time. In reality they spend most of their lives in sheltered spots where their only effort must be to keep their balance as they are touched by little currents in different directions.

The Pike, Pickerel, Muskalonge and gars have still a different habit. They lie quietly at or near the surface of quiet bays or lakes, usually in places where there is a growth of weeds to hide them. There is no swift current to fight at any time. They may lie almost perfectly motionless for hours, always poised for a quick dash at any moving object. At an alarm, they may dash away a few feet but in their ordinary life they very seldom swim more than a hundred feet without stopping to rest and look around.

The food of any fish bears such a close relation to its habits that we can not discuss one without the other. If we know one we can usually make a guess as to the other.

Most of the observations on the food and habits of the gars have been made on the species common in the northeastern United States (the Long-Billed Gar). Because all the species have much the same general appearance, it has been assumed that they are alike in habits. This is a rather dangerous assumption. We are not even sure that the same fish has the same habits in different places.

Because one species of gar is very destructive to fishes in the Great Lakes region, it has been supposed that all gars eat only living food, which has proved its life by moving where the fish could see it. Thus, we find in the books such statements as: "It is very destructive to all sorts of food fishes." Occasionally we may find a note in some obscure place which shows other food habits. Thus, Jordan*, in giving a list of fishes of the lowland streams, says: "In Perdido Bay .....fresh water Alligator Gars and marine sharks compete for the garbage thrown over from the Pensacola wharves." The more common idea of this great fish, however, has been similar to that of George Powers Dunbar**:

"Possessed of an exceedingly ravenous appetite, he snaps at and devours everything which comes in his reach, and yet there are times when the most dainty morsel will scarcely tempt him. Early in the morning the water is continually broken by him as he rises to seize the floating insects, or small fish swimming upon the surface; but, as the sun ascends, if on the feed, he takes to the deeper water, slowly moving along in search of his prey, and occasionally rising and rolling on the surface in sport. Tired of the chase, he may be seen basking his huge and motionless form in some sunny nook, the shoals of mullet frisking and frollicking around him unheeded. Rapid, current or pool, the clear running spring stream, the sluggish bayou, the pond, or the salt creek, all are familiar to him, but he particularly affects the deep still bayou, or the entrance of some sluggish stream into a bright, clear and dashing current. Stand on the little bar formed by the junction of the last mentioned, and you may see him pass and repass, plunging into the current after a small fish, diving under the rooty bank, and rolling in fun on the top of the dark bayou, and snapping his jaws together, as if the livelong day were only created for him to rollick in. The ringing steel launched from the sturdy arm of the fisherman glances harmlessly from his more than steel-clad body, the river robber rolls his huge form through the deep river, now rising like a porpoise, and now with noiseless movement of a cat swimming slowly to the shallows, stealing along through the bright green leaves of the beautiful nelumbium to surprise the sunny perch or sleeping pike, or suddenly attracted by a passing shoal of sardine or mullet, he dashes like light to their center, his capacious and horrid jaws wide open and his sinewy tail dealing death on every

*Guide to the Study of Fishes, I, page 313.

**American Naturalist, Vol. XVI, page 384, May, 1882.

side. The wary bass retires to his shady nook, and the little patasa dive deeper into their rooty recesses at his approach, and woe betide the unlucky wight who trails his well-filled string of bass at the stern of his pirogue; the river robber is sure to attempt a rescue, and well will it be for the angler, as seizure once made, if he have a single fish left, of his morning's sport."

The New Orleans Times-Picayune, Sunday, January 22, 1922, carried a long article on this fish. The writer tried to prove that the Alligator Gar is much more dangerous to human life, in the waters it inhabits, than is the "Man-Eater Shark." Many instances were given of persons being killed or injured by these fish. Mr. Percy Viosca, Jr., has discussed this point very fully and his conclusions are that the Alligator Gar is almost strictly a scavenger. He claims that it never seizes a bait which is moving and does not take a quiet bait unless it has a strong odor. His explanation of the cases where persons have been seized are that they had been feeding the gars fish offal and then held their hands or feet in the water.

According to Mr. Viosca, the gars are capable of some domestication and are frequently fed daily at a certain point. Under such conditions, a gar might easily make a mistake and seize a hand or foot where it expected to find food.

Mr. Viosca says that game fish will bite freely within a few feet of the point where gars are feeding on garbage and that it is not uncommon for small boys to be swimming there also. He even tells that one of his friends once unhooked a six-foot gar which had taken a bait, boy and gar both in the water, and then took a ride as the fish dashed away.

Mr. Viosca's account of the habits of the gar does not match exactly with that of Mr. Dunbar. The key to the difficulty may be found in the statements of a friend who lived many years on the banks of the Illinois River. He says that the Short-Nosed Gar commonly fed on the offal from the fish houses and that it

was a very common thing to see them waiting for fish waste to be thrown overboard. His fish of the same species, from the same locality, when kept in an aquarium will eat nothing but living minnows and he has never been able to get them to take any dead food of any kind.

It is probable that the accounts of Mr. Dunbar and of Mr. Viosca are both correct. Where garbage is plentiful the fish eat garbage. In other places they eat whatever they can catch. If the gars are in the habit of eating garbage at a certain point, it would hardly seem wise to smear one's hands with fish refuse and hold them in the water just there.

Man is so constituted that he considers the value of other living things solely on a basis of his own comfort or convenience. A fish is useful or valuable to him only as he can see some direct relation to his needs or pleasures. On this basis, much has been said against the gars and very little in their favor. The fish culturist says that they eat the food needed for his young fish, and, later, that they eat the young fish. The commercial fisherman says that they tear his nets and are not salable if he does land them. The angler says they are not game and that they eat the fish he wants to catch. These statements are correct, so far as they go. To find the value of the gars we must look at other points.

Gars are occasionally used as food. Dr. Meek found them sold in the markets at Tampico, Mexico, and considered good food. Dr. Hussakof found them being salted and smoked for food at Moon Lake, Mississippi. Dr. Smith, in his report on the fishes of North Carolina tells of their being sold in the market at New Bern. There are some other reports of the sale of these fishes, usually smoked, for food. Dr. Smith also tells, on the authority of Dr. Capehart, that,

before the use of steel plows, the mould-boards of wooden plows were sometimes covered with gar skin. Gars are sometimes used for fertilizer and there is sometimes a local demand for their oil.

Gars are not usually considered game fish. They do not often take artificial baits readily and very few sportsmen try to catch them. Mr. Dunbar told of his experience in fishing for Alligator Gars but did not tell what kind of bait he used. Mr. Viosca tells that if a strong-scented cut bait is used it is easy to get the big fish on a hook but intimates that it is not possible to land them on anything less than shark tackle. At this distance, it looks as though a large Alligator Gar should give a very interesting fight to anyone who might fish for it with cut bait on Tarpon tackle. While the Alligator Gar is not likely to do so much jumping as a Tarpon, large specimens should give a very interesting struggle.

The total value of gars as food, as game or as scavengers may not be very great but it is, at least, worth mentioning. Their value to the pearl button industry is probably as great, but the connection is so obscure that it has not been suspected until very recently. The relation between a pearl-handled knife and an Alligator Gar may not seem very close and yet the best shells for making knife handles and other novelties could not live without the gars.

To understand this point we must review the prominent points in the life history of the fresh water clam. The eggs of this creature, after being fertilized, pass into the gills of the mother and remain there until they have hatched. The young are called "glochidia" and do not look much like the river clams we know. The shells are of different shapes and often have long, sharp teeth on the edge.

At the proper season the glochidia leave the brood

pouch in their mother's gills and pass out into the water. There they drift around at the mercy of the currents until they die or find a proper place to anchor themselves. Some of them can anchor to the fins of almost any kind of fish. Others can fasten to the gills of almost any fish. Most of the more valuable species must reach the right place on some particular fish. This is the case with the Yellow Sand Shell (*Lampsilis anodontoides*) which Mr. R. L. Barney, Director of the U. S. Bureau of Fisheries Biological Station at Fairport, Iowa, says: "is without a doubt the most valuable shell of the Mississippi drainage because of its use in the manufacture of pearl handles for knives, razors, etc., and because of its serviceability in button manufacture." This shell must attach itself to the gills of a gar to pass through this next period of its life.

After it has become properly attached, the flesh of the fish grows up around the glochidium and it stays there as a true parasite for a time varying from several days to several weeks, when its transformation is complete. At the proper time the flesh around the young clam loosens and it falls to the bottom of the stream or pond, ready to feed and live like any other of its species.

The Yellow Sand Shell grows to large size. It is long and fairly straight. It is of soft, even texture and does not split readily into separate layers. It is free from color. Apparently it grows very rapidly under favorable conditions. Altogether it seems to be one of the most promising shells for artificial propagation. If it is to be raised for the use of the button factories it will be necessary to keep some gars in the breeding ponds. However, the stock of gars for this purpose does not seem to be in danger of being entirely destroyed immediately.

We may sum up the case of the Alligator Gar about as follows: Its enemies allege that it is very destructive to the game fish that live in the streams and ponds with it. They say that it is of no value as food for man. Some of them claim that it is very dangerous to human life. They say it destroys the nets of the commercial fishermen. Whether it destroys many adult fish or not, it eats a great deal of food that the young fish need.

On the other hand, we may say that it has some value as food. It has some value as a game fish and this value may increase. It is a scavenger, at least in certain localities. In its capacity as a scavenger it may injure human beings by mistake and this may be the explanation of the actual cases of injury or death. It is one of the three species that seem to be neccessary for the breeding of the best button shell.

Not much is known about the breeding of the Alligator Gar or about its growth after hatching but it is not likely that it is especially different from that of the other gars. A very good account of the habits of this fish was written almost a hundred years ago by Mr. George Powers Dunbar, a forgotten scientist, who made some observations about the lower Mississippi.

Mr. Dunbar says:

"During the months of December and January the fish seek the heads of the still and almost stagnant bayous or the deep caves of the sluggish rivers to deposit their spawn. The eggs are held suspended in a thick gelatinous transparent substance, forming long ropes several inches in diameter, which are hung on old snags, roots or branches of trees that have fallen into the water. The spawn has much the appearance of that of the frog, with the exception of the circular form it assumes, and the size of the eggs, which are about as large as No. 4 shot, and of a dark purple color. The young come forth during the spring, and tiny little rascals they are, but they grow with astonishing rapidity, and by the latter part of August are some fourteen inches in length and weigh several ounces; in one year they reach a weight of from nine to twelve pounds, and go on increasing to several hundreds. Large numbers of these fry are destroyed by

other fish, and well that it is so, otherwise no fish could live in any of the rivers for them, the ovaries of a large fish containing several hundred thousand eggs."

When young gars are first hatched they are very different in appearance from the adults. They have no bony plates and no long snout. The end of the snout projects beyond the rather small mouth and bears a patch of suckers which the little fish uses to attach itself to anything that seems to offer a safe hold. As the fish grows and the jaws are longer this patch of suckers is less needed and finally almost disappears. All that is left of it is the knob at the end of the upper jaw.

In the young gar the fins are indicated only by small folds of skin and the slender tail ends in a point. After a few days a small fin begins to show on the lower side of the tail. As this grows, the tail filament turns up more and more and either gets smaller or does not grow much until finally it is entirely hidden under the skin and scales while the fin, that started below, seems to be directly at the end of the body. By the time the young gar has reached a length of five or six inches it is practically like the adults in form but may be different in color.

The group in Hall 18 represents two of these large fish as they might be seen lying near the bottom in a quiet pool in a clear stream. In such places, where there is little current and where the sunlight can reach them, many of these fish may be seen, each facing the current and maintaining its position by very slight movements of tail or fins. Here they rest, perhaps for hours, until they start off on the search for food or play.

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BIBLIOGRAPHY

Very little has been published about the Alligator Gar. Most of the notices have been technical descriptions or popular accounts in newspapers or sporting magazines. In the following list some references to articles on other species have been included because they illustrate conditions or habits which are probably common to all the gars.

ABBOTT, C. C.—Riverside Magazine, Vol. I, 1867, pages 174-176. Science-Gossip, Vol. 8, 1872, pages 268-270.

In these places the author gives quite different accounts of the catching of what seems to be the same fish. In the former reference the fish is caught in a shad seine in the Delaware River. In the latter, it is killed in Crossweelssen Creek, a tributary of the Delaware River, by means of two jasper spear heads found on the bank of the creek. The account of the habits is substantially the same in each case and the two accounts of the killing of a large Chub by the gar are just the same. In the former article the author tells of seeing a man severely injured by a large gar which had been caught in a shad seine.

AGASSIZ, A.—Proceedings of the American Academy of Arts and Sciences, Vol. 14, 1879, pages 65-75, Plates.

This is a comprehensive technical account of the development of the Long-Billed Gar from the time of hatching until it had reached a length of about an inch.

DUNBAR, GEORGE POWERS—American Naturalist, Vol. XVI, May, 1882, page 381.

An account of the life and scientific studies of a man who was a keen observer but whose studies, except for a few notes published here, were lost by accident. The notes on the Alligator Gar are interesting and of great value. Mr. Dunbar studied fishes in the vicinity of New Orleans for about fifteen years beginning about 1835.

FORBES, S. A. AND RICHARDSON, R. E.—The Fishes of Illinois, Natural History Survey of Illinois, Vol. III, page 35.

A short technical description and a short account of the habitat, habits and uses.

HUSSAKOF, L.—"Copeia," No. 11, October 15, 1914.

A short account of the size and food of some Alligator Gars observed at Moon Lake, Mississippi, and at the New York Aquarium.

JORDAN, D. S.—"A Guide to the Study of Fishes," 1905, two volumes.

In this work, Dr. Jordan mentions the Alligator Gar in many places.

JORDAN, D. S. AND EVERMANN, B. W.—Fishes of North and Middle America, Bulletin 47, U. S. National Museum, Part 1, page 111, published October 3, 1896.

A short technical description of the Alligator Gar.

MEEK, S. E.—Fresh Water Fishes of Mexico North of the Isthmus of Tehuantepec, Field Columbian Museum, Publication 93, Zoological Series, Vol. V, page 7.

A brief technical account of the Alligator Gar and a mention of its use as food at Tampico, Mexico.

NEW ORLEANS TIMES-PICAYUNE, Sunday, January 22, 1922.

A long article under the heading "Alligator Gar More Dangerous than So-Called 'Man-Eater' Shark." This article gives many instances where human beings have been attacked by Alligator Gars. The article was discussed at great length by Mr. Percy Viosca, Jr., in a personal letter to the author.

SMITH, H. M.—Fishes of North Carolina, North Carolina Geological and Economic Survey, Vol. II, 1907, page 58.

A short technical description of the Long-Billed Gar and some reference to its uses, mainly as food.

WILDER, B. G.—"Gar-Pikes, Old and Young," Popular Science Monthly, Vol. XI, pages 1 and 186, May and June, 1877.

A long account of the habits and growth of the Short-Nosed Gar, and some discussion of its relationships.